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The researchers, whose findings are published in the American Chemical Society's Energy Letters, have coated gold nanowires in manganese dioxide and cocooned them in a Plexiglas-like gel. This combination keeps all the properties of the nanowires' intact and makes them resistant to fractures.

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Mya Le Thai, the lead study author, has charged and discharged the battery up to 200,000 times without breaking the nanowires and without loss of capacity.

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"Mya was playing around, and she coated this whole thing with a very thin gel layer and started to cycle it," said senior author Reginald Penner, chair of UCI's chemistry department, in a statement. "She discovered that just by using this gel, she could cycle it hundreds of thousands of times without losing any capacity."

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"That was crazy," he added,
"because these things typically die in dramatic fashion after 5,000 or 6,000 or 7,000 cycles at most."

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The researchers believe that the combination of the PMMA (plexiglass-like) gel electrolyte and themagnesium oxide gives flexibility and structure to the nanowires, preventing cracking and thus extending their operational life.

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"The coated electrode holds its shape much better, making it a more reliable option," Thai said.
"This research proves that a nanowire-based battery electrode can have a long lifetime and that we can make these kinds of batteries a reality."

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